

FAKULTÄT für PHYSIK  
LUDWIG-MAXIMILIANS-UNIVERSITÄT  
MÜNCHEN/GARCHING

PHYSIK-DEPARTMENT  
TECHNISCHE UNIVERSITÄT MÜNCHEN  
MÜNCHEN/GARCHING

## MLL-KOLLOQUIUM

Donnerstag, 30.01.2014, 16<sup>15</sup> Uhr

Hörsaal der LMU in Garching, Am Coulombwall 1  
Treffen zum gemeinsamen Kaffee 16 Uhr

**Prof. Vincenzo Patera**

(Univ. 'La Sapienza' Rome / Italy)

### Nuclear Aspects of Hadrontherapy

The use of proton and carbon ions beams in the treatment of solid cancer is getting a more and more widespread therapeutic practice. Hadrontherapy presents some advantages if compared to conventional radiotherapy: the charged beam dose release is peaked at the end of the particle range (Bragg peak) and can be precisely located on the tumor region, allowing to spare healthy tissues. Moreover, the biological efficiency in killing tumor cells is enhanced in the same Bragg peak region. In the future, the use of different light ions beams as Helium or Oxygen is envisaged, to better target radio-resistant tumors and to enhance ballistic precision. We will discuss several features of the nuclear interactions of ion beams in the patient tissue that have impact on the treatment quality. In particular, the nuclear fragmentation of the ion beam along its path in the patient is of relevance for the accuracy of the dose delivery, while the production of de-excitation photons, of  $\beta^+$  emitters and of protons emitted at large angle with respect to the beam can be exploited to monitor the dose profile. We will review the ongoing research activities in the field, including foreseen nuclear physics measurements, the proposed monitoring techniques and the related developments of Monte Carlo models.

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